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|  **BIOLOGY TEST REVIEW: MITOSIS, DNA/RNA, PROTEIN SYNTHESIS & MUTATIONS** |
| Label the diagram of the **Cell Cycle** below. http://vanessa.jeffreyjason.com/wp-content/uploads/2011/06/cellcycle.jpg | **Use the Cell Cycle diagram to answer the following questions.** 1. **What is the longest phase of the Cell Cycle? What percentage of time is spent in this phase?**
2. **Interphase is divided into 3 phases. List & describe each phase.**
3.

1.
2.
 |
| **Definition of Mitosis:** **3 Reasons Mitosis is important…**1.
2.

1.

 \*For each of the stages of Mitosis listed below, briefly explain what happens and draw a picture of a cell in that stage. | **Complete the table about Mitosis below.**

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| **Parent Cell (n or 2n)** |  |
| **# Daughter Cells Produced** |  |
| **Daughter Cells (n or 2n)** |  |
| **# of Cell Divisions** |  |
| **Relationship between mother and daughter cells** |  |
| **Relationship between daughter cells** |  |
| **Where does it happen?** |  |
| **# of Stages** |  |

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| **PROPHASE** | **METAPHASE** | **ANAPHASE** | **TELOPHASE** |
| **Vocabulary: Match the definition with the appropriate term***.* \_\_\_\_\_ 1. division of the nucleus\_\_\_\_\_ 2. region of the chromosome where sister chromatids are attached\_\_\_\_\_ 3. division of the cytoplasm\_\_\_\_\_ 4. phase of mitosis in which spindle fibers attach to the centromere of each pair of sister chromatids\_\_\_\_\_ 5. coiled structures made of DNA and proteins\_\_\_\_\_ 6. phase of mitosis in which sister chromatids separate and the centromeres divide\_\_\_\_\_ 7. a segment of DNA with the genetic instructions to make a protein\_\_\_\_\_ 8. two copies of replicated DNA that make a chromosome\_\_\_\_\_ 9. the first and longest phase of mitosis\_\_\_\_\_ 10. uncoiled DNA\_\_\_\_\_ 11. a pair of the same chromosome\_\_\_\_\_ 12. phase of mitosis in which the chromosomes begin to uncoil and form chromatin |
| **Word Bank:** Anaphase(a), Centromere (b), Chromatid (c), Chromatin (d), Chromosome (e), Cytokinesis (f), Gene (g), Homologous Chromosome (h), Metaphase (i), Mitosis (j), Prophase (k), Telophase (l) |
| What does **DNA** stand for? | Where is DNA **located** in the cell? | What does DNA **look** like? |
| **Draw and label a DNA nucleotide.** | **In DNA…*** **Adenine** pairs with…
* **Cytosine** pairs with…

\*Nitrogenous bases are held together by… |
| **Match each scientist with their contribution to the discovery of DNA.**

|  |  |
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| 1. \_\_\_\_\_ Franklin
2. \_\_\_\_\_ Griffith
3. \_\_\_\_\_ Hershey & Chase
4. \_\_\_\_\_ Watson & Crick
5. \_\_\_\_\_ Avery
6. \_\_\_\_\_ Chargaff
 | a. Concluded that DNA was the factor that caused one bacterium to transform into anotherb. Used x-ray diffraction to determine DNA structurec. Concluded that bacteria could be transformed from harmless to lethal from an unknown factord. Developed the double-helix structural model of DNAe. Concluded that the genetic material of a bacteriophage is DNAf. Showed that the percentages of nitrogenous bases in DNA are present in equal amounts |

**http://01.edu-cdn.com/files/static/mcgrawhillprof/9780071626613/CELLS_04.GIFDNA Diagram:** Color the DNA diagram below using the following key. Phosphate (RED), Deoxyribose Sugar (BLUE), Adenine (GREEN), Cytosine (PURPLE), Guanine (ORANGE), Thymine (Yellow), Hydrogen Bonds (GRAY). Then, draw a circle around a nucleotide. **DNA Replication:** Put the steps of DNA replication in order by writing a number (1-5) in the space before each statement.\_\_\_\_\_ Two new molecules of DNA are created.\_\_\_\_\_ DNA polymerase attach the free-floating nucleotides to the exposed nitrogen bases.\_\_\_\_\_ Helicase begins to break the hydrogen bonds between nitrogen bases.\_\_\_\_\_ Cell starts into the mitosis phase of the cell cycle.\_\_\_\_\_ Free floating nucleotides pair up with exposed nitrogen bases.

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| **Why** does DNA replicate? | **When** does DNA replicate? | **Where** does DNA replicate? |

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| What does **RNA** stand for? | What are the **3 types** of RNA? | Where does **Protein Synthesis** occur? |
| **Compare and Contrast…****TRANSCRIPTION:****TRANSLATION:**  | **Compare and Contrast…****CODON:****ANTICODON:**  |
| **Sequence:** Put the following steps of Protein Synthesis in order by numbering 1 through 5.\_\_\_\_\_\_\_\_ mRNA leaves the nucleus with the DNA code, and goes to the ribosomes\_\_\_\_\_\_\_\_ribosomes make proteins\_\_\_\_\_\_\_\_mRNA and tRNA meet in the ribosomes\_\_\_\_\_\_\_\_DNA temporarily unzips\_\_\_\_\_\_\_\_mRNA nucleotides match up to DNA | Label the following diagram with these terms: **DNA**, **mRNA, tRNA, ribosome, nucleus, codon, anticodon, and protein.**  |
| The code on a DNA strand reads:  **G C G T A A T G A**1. The **mRNA** strand would read: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Use the **mRNA** to now make **tRNA**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. How many amino acids have been coded for by the above DNA strand? \_\_\_\_\_\_\_
4. **What** are proteins composed of? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. **Where** are proteins made? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the role of tRNA? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. What is the role of mRNA? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. How many different types of amino acids are there? \_\_\_\_\_\_\_
9. What molecule found in the nucleus carries (has) the code for making a protein? \_\_\_\_\_\_\_
10. When the information from DNA is passed to RNA this process is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. Give the **DNA** segment for the following strand of **mRNA**. A U G G C A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Give the **mRNA** segment for the following strand of **tRNA**. C U U A A G \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Where does **transcription** occur? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. What is a **similarity** of DNA and RNA? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. What base is unique to **DNA**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
16. What base is unique to **RNA**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
17. What **molecule** is RNA transcribed from? \_\_\_\_\_\_\_\_\_
18. How many bases make up a **codon**? \_\_\_\_\_\_\_
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| **Complete the diagram below using your knowledge of Transcription and Translation.****codon chart** |
| **Using a Codon Chart.**1. Name the amino acids that are coded by the following codons:
2. AAA= e. CAC=
3. UAC= f. UGA=
4. GGG= g. AGC=
5. GGA= h. CCC=
6. Write the amino acid sequence to make up the protein: GCA – GGU – CCA – AUG – UGC
7. Write the amino acid sequence to make up the protein: GCA – GGU – CCG – AUA – UGC
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| **Define MUTATION:**

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| **Deletion** | 1. **A piece of one chromosomes breaks off & attaches to a neighboring chromosome**
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| **Duplication** | 1. **A nitrogenous base is added/inserted to a DNA sequence**
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| **Inversion** | 1. **A sequence of genes become oriented in the reverse direction**
 |
| **Translocation** | 1. **A nitrogenous base or gene is lost/deleted**
 |
| **Substitution** | 1. **Extra copies of a gene(s) are added to a chromosome**
 |
| **Insertion** | 1. **A nitrogenous base is substituted for another nitrogenous base**
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